APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE OF INVENTION

TOWER FAN ASSEMBLY WITH TELESCOPIC SUPPORT COLUMN

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CROSS-REFERENCE TO RELATED APPLICATION

[0001] n/a

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] n/a

FIELD OF THE INVENTION

[0003] The present invention relates to a tower fan apparatus and more specifically to a vertical axis tower fan assembly having a telescopic support column.

BACKGROUND OF THE INVENTION

[0004] Typical fixed-height floor fans are comprised of a base, support column, and a large, circular grill that encloses revolving fan blades. The fan is therefore at a fixed height, and though it usually provides an oscillation mechanism to allow the grill and fan blades to rotate thereby cooling an area in a region substantially in front of the fan, the height of the column is fixed. This limitation prevents a user from raising or lowering the column in order to cool a wider target region.

[0005] Floor fans of the type described above are also heavy and cumbersome, due to the large circumference of their grill. This is to contain the large fan blades therein. If a fan is manufactured with a smaller circumference grill, in order to provide a fan that is easier to maneuver and transport, the fan blades must be smaller, leading to a fan that may not sufficiently cool a larger area. If the fan blades are larger, a larger cooling region might be obtained, but the result is a fan that is large, unsightly and difficult to maneuver and/or transport. Finally, no matter how one may tilt the grill of the typical floor fan, there is an inherent limitation based upon the fixed height of the column supporting the grill. A non-adjustable column results in a

fan that has a limited cooling range. A floor fan with a very long fixed column may cool a wider area but is ineffective for small target regions, i.e. cooling a person sitting at a desk. On the other hand, a floor fan with a short, fixed support column may be effective when targeting a small region and when it is placed on a desk or table, but is ineffective in cooling off a larger, or higher target area when placed directly on the floor.

[0006] Height-adjustable grill fans have limitations due to fact that grill fans do not direct the flow of cooled air in a specific, narrow region. The grill represents the fan "housing" and does nothing to direct the flow of air. Even though some grill fans may be manually raised or lowered, they lack the general effectiveness of tower fans, which provide a direct stream of cooled air to a specific, targeted region.

[0007] Tower fans provide the benefit of a streamline housing, which takes up significantly less space than typical circular grill fans, and also provide a concentrated stream of directed cooled air flow. Tower fans include vertical-axis propellers that rotate about an axis perpendicular with the floor. However, tower fans possess the same limitation as circular grill fans in that their height is restricted due to the fixed height of its support column. Typical tower fans with fixed-height fan blades project a narrow stream of cool air, but only to a limited target region. In order to target a greater region, the fan must be lifted and repositioned at a precise location in order to change the cooled target region. The user is without means to alter the height of the propeller blades with respect to the floor.

[0008] What is therefore needed is a tower fan with vertical-axis propeller blades that is height adjustable in order to provide a user with a quick and easy way to target a wide range regions that can receive cooled air.

SUMMARY OF THE INVENTION

[0009] The present invention advantageously provides a tower fan apparatus with an extendable and retractable support column to allow a user to selectively adjust the column in order to vary and target a variety of effective cooling regions proximate the fan assembly.

[0010] According to one aspect of the present invention, a tower fan is provided. The tower fan comprises a height adjustable pedestal, a fan assembly rotationally coupled to the pedestal, and a housing enclosing the fan assembly.

[0011] In another aspect of the present invention, a height adjustable tower fan is provided. The height adjustable tower fan includes a base assembly, a height-adjustable support column extendable from the base assembly, a housing assembly rotatably mounted upon the support column, a vertical axis fan assembly enclosed within the housing assembly and rotatably mounted therein, and a motor assembly enclosed within the housing for actuating the fan assembly from an inoperative to an operative orientation. The height-adjustable support column has a first upper end rotatably coupled to the housing assembly and a lower second end insertable within the base assembly, the support column movable between fixed, retracted position and extended positions.

[0012] In another aspect of the present invention, a method of adjusting the height of a tower fan assembly is provided. The method includes the steps of providing an adjustable support column rotatably supporting a vertical axis fan assembly, the support column including an extendable member slidably insertable within a pillar member, retracting or extending the extendable member to a desired height, and locking the support column at the desired height thereby maintaining the fan assembly in a fixed position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] A more complete understanding of the present invention, and the attendant advantages and features thereof, will be more readily understood by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

[0014] FIG. 1 is a perspective view of the tower fan assembly of the present invention in a retracted position;

[0015] FIG. 2 is a perspective view of the tower fan assembly of the present invention in a extended position;

[0016] FIG. 3 is an exploded view of the tower fan assembly of the present invention;

[0017] FIG. 4 is a front view of the motor housing and power supply subassemblies of the present invention; and

[0018] FIG. 5 is a front view of the decorative ring of the housing assembly of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The present invention is a tower fan apparatus with a telescopic support column that allows for a user to selectively extend or retract the support column in order to raise or lower the fan such that an appropriate range of target regions may be reached. The apparatus includes a fan assembly having of a plurality of vertical axis propeller blades disposed around a spindle, wherein the spindle is rotatably mounted within a housing. The housing is supported and rotatably mounted on the adjustable column, which is itself supported by a base. Keypad control buttons situated on the top of the housing allow the user to selectively operate the fan and select from a variety of operating modes. Functions include activation of the fan, the activation of an

oscillation mode, the activation of a timer, and the selection of propeller speeds and wind patterns.

[0020] Referring to FIG. 1, the tower fan assembly of the present invention can be seen. Tower fan assembly 10 includes a base 12, a height-adjustable support column 14, and a vertical axis fan assembly 16 within a housing 18. The fan assembly includes vertical axis propeller blades situated around a spindle. The spindle is rotatably mounted within the housing, and when activated, spins about a vertical axis perpendicular with the floor. FIG. 1 shows the assembled tower assembly 10 in a fully retracted position. Housing 18, containing fan assembly 16, may be raised or lowered by the manual raising or lowering of column 14. This provides the user with the unique capability of directing the blades of the fan assembly 16 at various target heights in a given area. In the orientation shown in FIG 1, for example, as fan assembly 16 spins about its vertical axis within housing 18, cooling air may be directed towards a target lower to the floor at, for example, a person seated at a desk or sleeping in a bed, due to the retracted position of column 14.

[0021] In FIG. 2, housing 18 has been raised to its maximum height. Column 14 can be seen in its fully extended position. This configuration may be beneficial to a user that wants to cool the air in a larger area, for example, in a room where people are standing. It should be noted here that housing 18 (and therefore the propeller blades of fan assembly 16 therein) may be raised or lowered to any position between the fully retracted position (FIG. 1) and the fully extended position (FIG. 2) by raising or lowering column 14. This provides a wide range of target regions. Housing 18 may also oscillate about its vertical axis via use of keypad controls 46 located in cover 40 of housing 18. Alternately a remote control unit may be used to control

oscillation of housing 18. The remote control unit may be stored beneath a retractable door 48 in a cover 40 of housing 18. The telescopic features of support column 14 will be discussed below.

[0022] It is within the scope of the present invention to provide a tower fan that may be supported by any substantially flat surface, such as a floor, table, nightstand or desk. Further, the fan assembly 10 of the present invention may come in all sizes and dimensions, and may be made of any sturdy material. For example, the base 12, support column 14 and housing 18 may be made of Polypropylene plastic or ABS Acrylonitrile Butadiene Styrene (ABS) plastic. Base 12 may also be made of chrome plated aluminum or steel. The material that comprises the components of assembly 10 is not critical to the operation and function of the invention.

[0023] Referring now to FIG. 3, an exploded view of tower fan assembly 10 can be seen. Base 12 provides support for fan assembly 10. Base 12 includes an aperture 19 into which the lower end of column 14 may be inserted and secured. Base 12 may also include weights embedded between its upper and lower surfaces in order to provide additional ballast to the base in order to prevent the fan assembly from toppling over due to the application of unwanted tangential forces to its upper portion. Screws or other securing devices may be used to fully secure column 14 within base 12. Column 14 includes of a number of components. Elongated pillar 22 forms the lower section of column 14. The lower end of pillar 22 is inserted into and secured within base 12. Pillar 22 is hollow and comprised of sturdy material such as steel or hard plastic. Pillar 22 must have an inner diameter of sufficient size in order to receive both elongated extension member 24 and power cord 26 (shown in FIG. 4). In an alternate embodiment, power cord 26 exits not through the bottom of base 12 but through the bottom of housing 18.

[0024] Cover 28 fits over the top of pillar 22. Cover 28 is cylindrical and includes an aperture to allow for the insertion of extension member 24 and other components, including power cord 26, into pillar 22. A connecting flange 30 is comprised of two components, a connecting cylinder 31 and a connecting plug 33. Plug 33 fits over cover 28 and receives cylinder 31. Connecting flange 30 allows for the connection between extension member 24 and pillar 22, which forms the prime components of the telescoping support column 14 of assembly 10.

[0025] Column 14 includes a rotatable, cylindrical locking sleeve 32 that receives pillar 22. Extension member 24 is a hollow column with an inner diameter smaller than the inner diameter of pillar 22. Extension member 24 is insertable within pillar 22 and freely movable therein. However, sleeve 32 may be tightened or loosened to prevent or enable (respectively) movement of member 24 within pillar 22. For example, when sleeve 32 is turned and loosened, extension member 24 may be moved downward, i.e. retracted further within pillar 22, thereby lowering housing 18, which contains fan assembly 16. Additionally, with sleeve 32 loosened, extension member 24 may also be extended upward, i.e. extracted from within pillar 22, thereby raising housing 18 and fan assembly 16. After the user properly adjusts the height of housing 18 in this manner, sleeve 32 may be turned, in the opposite direction, and tightened around pillar 22 thereby trapping the portion of extension member 24 that is within pillar 22. The result is that member 24 remains fixed and housing 18, and therefore fan assembly 16, becomes locked into a fixed, desired position.

[0026] Housing 18 is comprised of a front enclosure 34, a back enclosure 36, a grill or filter 38, a top cover 40, a bottom cover 50, and a decorative ring 44. Bottom cover 50 also acts as a support for a motor 52, which drives the fan assembly 16. Housing 18 encloses a vertical axis

fan assembly 16. Fan assembly is comprised of a plurality of vertical axis blades 51 about a spindle 53. When activated, the propeller blades 51 of fan assembly 16 rotate about a vertical axis, which is perpendicular to the floor. A motor 52 is situated at the bottom of housing 18 between fan assembly 16 and a motor housing 42 and is electrically connected to fan assembly 16. The spindle 53 of the fan assembly 16 is rotatably mounted within motor housing 42. Upon activation, motor 52 drives fan assembly 16, causing the spindle and blades to rotate about its vertical axis, within housing 18. Grill 38 is situated over an aperture within housing 18. The aperture allows air to be cooled by the spinning blades 51. Grill 38 offers protection to fan assembly 16 from unwanted debris, while at the same time preventing fingers or other objects from contacting the blades 51 of fan assembly 16. Motor 52 may be any type of motor capable of driving fan assembly 16 with enough speed to sufficiently cool a target area. For example, the specifications of a typical motor powerful enough to be used in the present invention may be 120 V AC , 60 Hz., 0.45 amps, 53 watts.

[0027] The speed of rotation of fan assembly 16 can be controlled via a keypad 46 situated on housing cover 40. Electrically conductive wires connect the buttons of keypad 46 to the motor 52. In addition to controlling the speed of rotation of fan assembly 16, buttons on keypad 46 may also activate or deactivate assembly 10, activate and deactivate the oscillation mode, activate and set a timer, and control wind patterns created by fan assembly 16. During oscillation mode, the housing 18 itself rotates back and forth about the top of member 24 at pre-determined time intervals. During the wind pattern mode, a variety of varying fan rotation speeds may be programmed. A microcontroller, enclosed within housing 18, receives input signals via the keypad 46 and controls the various modes of operation of fan assembly 16 and housing 18. An LED display 44 on cover 40, receives signals from the microcontroller and

allows the user to view and set the different modes of operation. Finally, cover 40 includes a door 40 that can be opened and used to cover a compartment which can house, among other things, a remote control that can perform all of the operations of the manual keypad.

[0028] Turning now to FIG. 4, the motor and power subassembly of the present invention can be seen. Power cord 26 extends down from the bottom of motor 52 through motor housing 42 and through the interior of member 24 and pillar 22 where it protrudes from its bottom of base 12 for connection to an AC power source. Alternatively, power cord 26 may exit motor 52 and exit from the bottom of housing 18. Tightening sleeve 32 can be seen clearly in FIG. 4, enclosing a portion of pillar 22. Extension member 24 can be seen protruding just above pillar 22, in a retracted position. Motor housing 42 receives motor 52 and fan assembly 16. Housing 18 (not shown in FIG. 4) completely encloses fan assembly 16, motor, 52 and motor housing 42. Sleeve 32 may be turned in one direction (for example counter-clockwise) in order to loosen the sleeve and allow member 24 to slide either up or down in relation to pillar 22, thereby raising or lowering the housing 18 and fan assembly 16 therein. Turning sleeve 32 in the opposite direction prevents further movement of member 24 thereby locking housing 18 and fan assembly 16 at a fixed height.

[0029] It should be noted that the present invention is not limited to the tightening sleeve 32 described above as the only means of providing or prohibiting the height adjustment of column 14. Other similar methods of achieving a telescopic relationship between member 24 and pillar 22 may be used. For example, a cylindrical locking sleeve may encircle pillar 22 and instead of twisting the sleeve to lock extension member 24 at a fixed height, a lever may be pressed, that maintains extension member 24 within pillar 22.

[0030] FIG. 5 illustrates the decorative ring 44 that includes one or more LED displays 45 about its periphery. Each LED represents a different setting for varying speeds, time designations, Sleep Mode, or wind patterns. As described, these settings may be set via use of the keypad controls 46 in cover 40 or via a wireless remote control unit, preferably stored under door 48 in cover 40.

[0031] To use the tower fan assembly of the present invention, assembly 10 is placed in a desired location on a substantially flat surface such as the floor, a table, a night stand, a desk or the like. The user may then activate the fan assembly 16 my pressing the desired button on keypad 26, or by removing the remote control unit from within cover 40 and pressing the proper button. The user then loosens sleeve 32 and raises or lowers column 14 by either raising or lowering housing 18 itself or by retracting or extending extension member 24. Once housing 18 is at a desired height, the user twists sleeve 32 in a direction opposite to the direction used for allowing extension member 24 to retract or extend. This prevents extension member 24 for retracting or extending further by applying pressure on pillar 22, which, in turn, applies pressure against extension member 24. This applied pressure prevents any further movement of column 14. The user may now activate any of the optional functions such as wind patterns and/or oscillation mode. If the user wants to redirect cooling air exiting the housing 18, he or she may simply repeat the steps above to readjust the height of housing 18 to a new desired target area.

[0032] It will be appreciated by persons skilled in the art that the present invention is not limited to what has been particularly shown and described herein above. In addition, unless mention was made above to the contrary, it should be noted that all of the accompanying drawings are not to scale. A variety of modifications and variations are possible in light of the

above teachings without departing from the scope and spirit of the invention, which is limited only by the following claims.